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(54) Dispenser for fluids

(57) The invention relates to a dispenser for fluids comprising a container of an elastic flexible material, such as plastics, having a dispensing spout (3) at one end and a closure member (6) provided within said container dispensing taking place by squeezing the front surface of said container inwards, said container being securable to a base with the dispensing spout directed downwards. The dispensing spout is cone-shaped and is severable at predetermined points (4) which are determined as a function of the viscosity of the liquid to be dispensed and of the elasticity of the compressible container. The closure member is formed by a sleeve having an open-pore, netlike or perforated channel area (7) and/or a flexible closure plate (8) having one or more slits, Figs 7—15 (not shown).

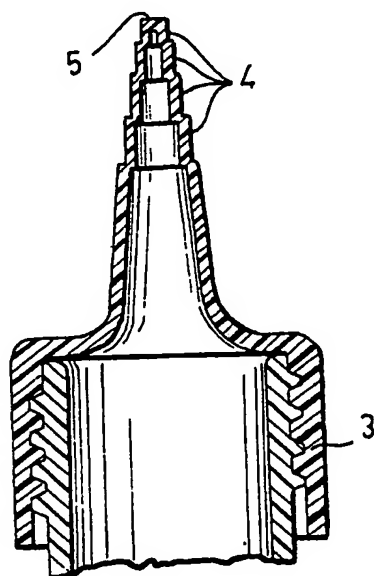


FIG. 3

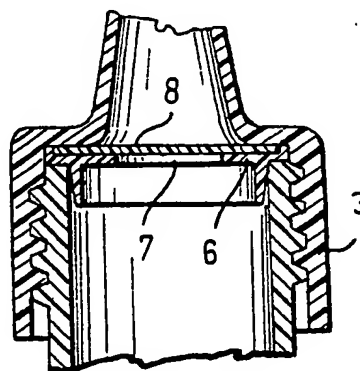


FIG. 4

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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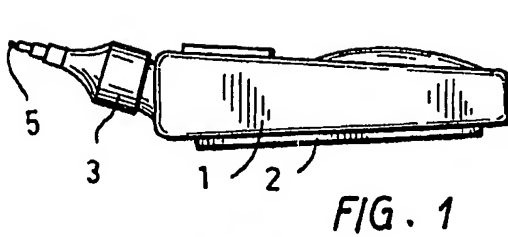


FIG. 1

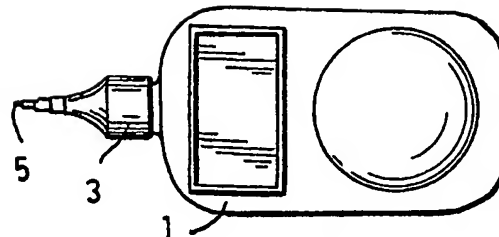


FIG. 2

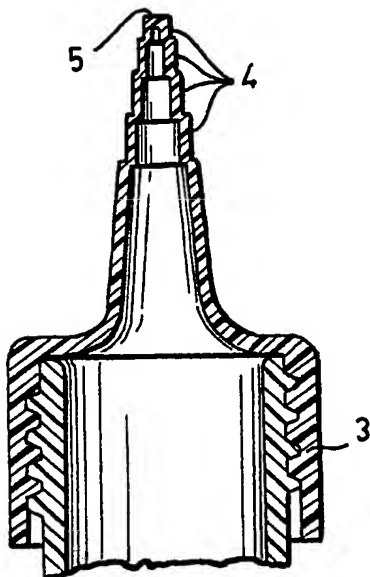


FIG. 3

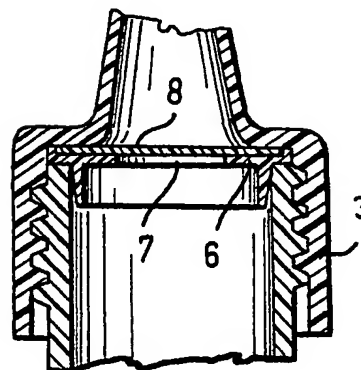


FIG. 4

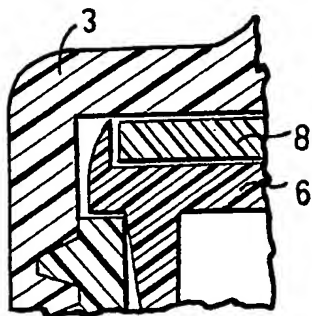


FIG. 5

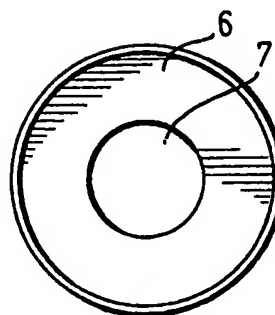


FIG. 6

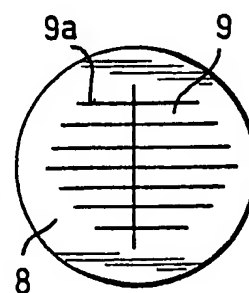


FIG. 7

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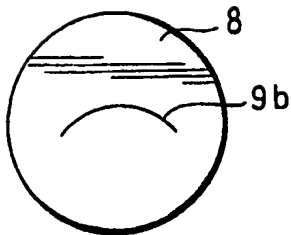


FIG. 8

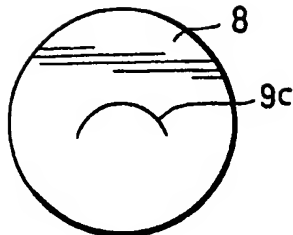


FIG. 9

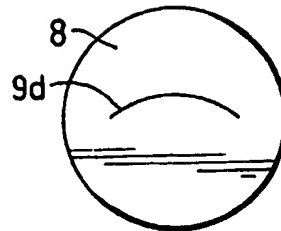


FIG. 10

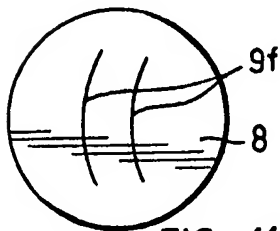


FIG. 11

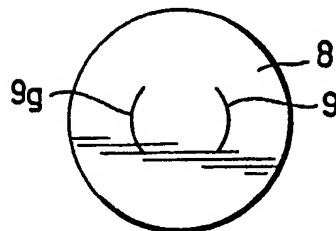


FIG. 12

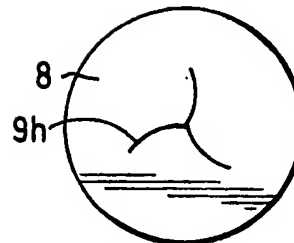


FIG. 15



FIG. 13



FIG. 14

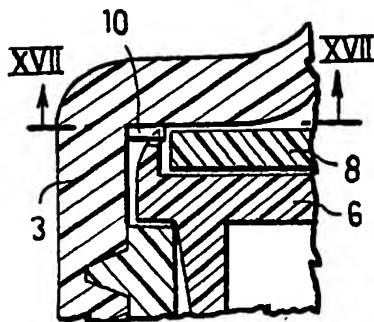


FIG. 16

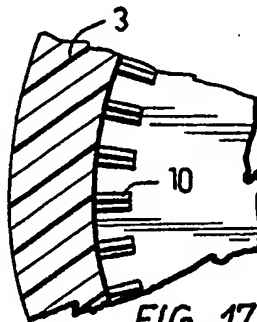


FIG. 17

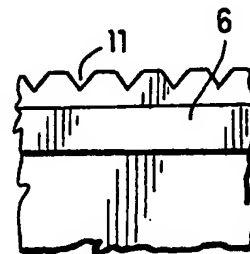


FIG. 18

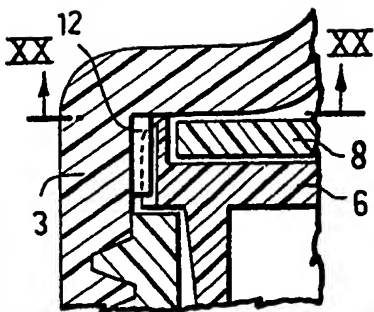


FIG. 19

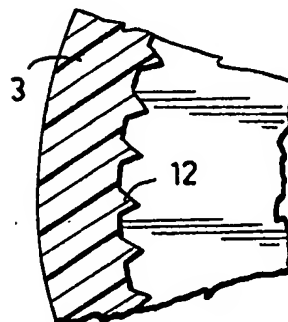


FIG. 20

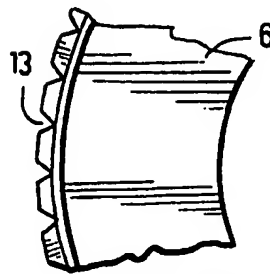


FIG. 21

## SPECIFICATION

## Dispenser for fluids

The present invention relates to a dispenser for fluids comprising a container preferably of an elastic material, such as plastics, having a dispensing spout at one end, a closure member possibly being provided within said container, while dispensing takes place by squeezing the front surface of said container inwards, said container being securable to a base with the dispensing spout directed downwards.

Thus, the invention relates to a dispensing container for fluids from which dispensing is effected by means of well-known "pumping": the front wall is squeezed inwards whereby the wall, because of its elasticity, is restored upon termination of the squeezing.

In addition, the invention relates to a closure member for liquid- or paste-containing dispensers of a flexible material.

When the dispenser is secured with the dispensing spout directed downwards, the substance to be dispensed stays within the container. During pumping liquid is discharged, but on termination of the pumping the discharge of liquid stops. Hereafter, a corresponding air volume must be admitted into the container in order to prevent an increase of the underpressure in the container. Admission of air through the orifice into the container is of a decisive significance in conjunction with the container according to the invention because the container otherwise will be flattened.

The container does not leak because of the low underpressure prevailing in its upper part. In addition, air bubbles, upon termination of dispensing, form an air cushion preventing the flow of liquid in the orifice or immediately above the closure member or in both said locations.

From German Patent 2,024,294 is known a dispenser for wash liquid which at one end has an orifice provided with threads inside which a nozzle provided with openings and a closure pin is arranged. A screw cap provided with discharge holes is arranged around the orifice. The nozzle can be closed and opened by turning said cap. This container is intended to be held on a horizontal base, in corresponding locations as a conventional soap. When dispensing the wash liquid, the container must be taken into the hand, the cap must be turned to the open position and the front wall of the container must be squeezed inwards for dispensing the liquid.

The Finnish Patent 23,699 describes a closure member for compressible tubes containing liquids or pastes comprising a widened curved portion made of rubber or any similar elastic material and provided with a slit-like ejection opening and a cylindrical portion adjoining said curved portion. However, the known closure member admits no replacement air into the container wherefore it can be used only in conventional compressible metal tubes. It is not suitable for containers made of a flexible material, such as plastics.

The US Patent 4,133,457 describes a liquid dispenser bottle provided with a plate-like closure member, i.e. a flexible septum. This septum is in its central portion provided with slit-like cuts, from which liquid is dispensed, and with a least one tiny hole intended to improve the flexibility of the closure septum and to admit replacement air into the container in order to prevent flattening of the container. Thus, the known dispenser is not tight and cannot be used while secured to a vertical plane, with the dispensing spout facing downwards. The closure plate mainly prevents liquid from flowing rapidly out of the container, for example, when it is overturned.

The container according to the invention is characterized in that the dispensing spout 3 is cone-shaped and can be snapped off/is severable at predetermined points 4 which are determined as a function of the viscosity of the liquid to be dispensed and of the elasticity of the compressible container, and in that a closure member 6 possibly is located between the dispensing spout and the container through which closure member one or more channels/passages pass during flow.

Preferably, a closure member, i.e. a septum made of rubber or any other elastic material and provided with one or more curved cuts is located between the dispensing spout and the container. The cut is preferably Y-shaped.

In use, the dispenser according to the invention is simpler and more hygienic than the known dispensers. When it is secured to a wall and ready for use, the only step to carry out is to "pump" fluid out of the container. When the hands are more or less dirty and, for example, wash liquid is needed, the wall of the container can be squeezed inwards with the side of the hand; after use, the container automatically closes tightly.

As fluids to be dispensed can be used substances having a viscosity varying from liquid to paste, for example, wash liquid, hand lotion, shampoo, hair balsam, shaving cream, various skin-care milks, etc. Of interest are so-called thixotropic substances which, at rest, have a high viscosity but which, when put in motion, as when pumped from the container according to the invention, are liquids.

Containers containing different substances to be dispensed, such as wash liquids, hand lotion, shampoo, etc., can be secured side by side above a wash-basin, in which case the different containers can be simply distinguished from each other by making the containers different in colour.

In the following the invention will be described in more detail with reference to the drawing. Figure 1 is a side view of a dispenser, and Figure 2 is a front view thereof. Figure 3 is a section through the dispensing spout of the dispenser.

Figure 4 is a section through the closure member of the dispenser.

Figure 5 and 16 to 21 illustrate a detail of the location of the closure member in the dispenser.

Figure 6 shows a closure member.

Figure 7 to 14 show closure plates.

The container 1 can be made, for example, of an elastic flexible plastic, such as polyethylene or polyvinylchloride. The rear surface of the container has an adhesion surface of adhesive material, such as a self-adhesive surface 2 by means of which the container is securable to its base with the dispensing spout 3 directed downwards. The container is intended for attachment to a wall, for example, above a wash-basin.

Preferably, the dispensing spout 3 comprises a nut portion and a conical spout portion which is severable at predetermined points. The severing points are determined as a function of the viscosity of the liquid to be dispensed and of the elasticity of the compressible container. The orifice of the dispensing spout is closed by a tip 5 or any other corresponding member formed in connection with the manufacture of the container.

When the container is secured upside down, i.e. with the open-ended dispensing spout 3 facing downwards, the substance to be dispensed stays in the container due to the underpressure prevailing in the upper part thereof. In examinations it has been found that water having a viscosity at 20°C of 1 centipoise stays in a container in which the diameter of the orifice of the dispensing spout is 1 mm. During pumping fluid is discharged but upon termination of the pumping the discharge of fluid ceases. When pumping fluid out of the container, a corresponding air volume must be admitted into the container in order to prevent an increase of the underpressure in the container. Admission of air through the orifice into the container is of a decisive significance in conjunction with the container according to the invention having a downwardly directed open-ended dispensing spout.

In addition, the admission of air through the orifice into the container is of importance in that respect that, on termination of the pumping, a couple of liquid drops are still discharged from the spout of the container. These liquid drops are replaced by air bubbles which form a flow barrier for the liquid within the container. If a closure member 6 and/or a closure plate are provided in the container between the dispensing spout and the container, the few air bubbles entering the container after pumping form a flow barrier immediately above the closure member, and at the same time a flow barrier is formed of air bubbles in the spout of the container.

The diameter of the orifice of the dispensing spout may vary within a wide range of, for example, 0.1 to 6.0 mm. As the diameter of the orifice increases, the viscosity and/or the surface tension of the substance to be dispensed is increased. As mentioned above, water having a viscosity of 1 stays in a container in which the diameter of the orifice is 1 mm. Thus, an orifice having a diameter of 1 mm is suitable also for real liquids but is also suitable, for example, for

creams. Therefore, for practical reasons, a diameter of 1 mm of the orifice can be chosen for all fluids which are dispensed by means of the container according to the invention.

The length of the dispensing spout may vary: it may be, for example, 2 to 4 cm, preferably 3 cm. Also the number of the severing points in the dispensing spout may vary. For example, a dispensing spout having a length of 2 to 3 cm may have 2 to 4 severing points located in positions where the inner diameter is about 1.10 and 0.70 mm or about 1.25, 1.00 and 0.75 mm or about 2.40, 2.00, 1.50 and 1.00 mm.

The closure member 6 and/or closure plate, if any, are located between the dispensing spout and the container. The closure member is formed by a sleeve having a netlike open-pored or perforated channel area 7. It is made of a relatively stiff material, such as plastic or metal. The area 7 is a netlike or perforated area or a coarse-fibered felt or net layer.

Preferably, the closure member comprises a sleeve made of plastic and having a perforated channel area where the total area of the perforations is about 10 to 20% of the surface area of the channel area. The coarse-fibered layer comprises, for example metal wool. The length of the channels in the channel area is 0.5 to 1.3 mm, preferably 1.0 mm.

The closure member may also comprise two parts in which case it, in addition to the closure member 6, has a separate, preferably circular closure plate 8. The closure member is formed by a sleeve which is made of rigid material and which may be provided with a netlike, open-pored or perforated channel area 7 which is a netlike or perforated area of a coarse-fibered felt or net layer.

The closure member may also consist of a closure plate 8 and a sleeve 6 arranged at the end of the container neck and supporting the closure plate. Said sleeve is preferably provided with one or more teeth embedded in a corresponding toothing in the dispensing spout.

The closure plate is a plate made of a flexible material, preferably rubber, having a bounce of between 35 and 75%, preferably about 62% (SIS 162 215), and a hardness of 20 to 60, preferably about 40, as measured by an IHR device. The material is preferably chemically resistant. The thickness of the plate is preferably 0.7 to 1.3 mm.

The cut in the closure plate is preferably curved and Y-shaped (Figure 15). The length of the cut is about one half of the diameter of the closure plate and the diameter of curvature is preferably the same as the diameter of the closure plate.

Other preferred closure plates having one or more cuts in the centre are shown in Figure 8 to 14. A suitable diameter of curvature is about 1/2 to 3/4 of the diameter of the container orifice, and a suitable length of the cut is 1/4 to 1/2 of the orifice diameter. The thickness of the plate is preferably 0.7 to 1.3 mm.

When the closure plate has only one cut, it must be quite perpendicular to the plane of the

plate (Figures 8 to 10). If the number of cuts is greater, they extend preferably obliquely with respect to the plane of the plate (Figures 11 to 14) so that each cut opens in one direction only which guarantees a more tight closing thereof. Said cuts are cut obliquely so that a part of them opens on one side of the closure plate and a part on the other side thereof. The individual cuts may also have different diameters of curvature.

10 The channel area 9 of the rigid plate is a net-like or perforated area or a coarse-fibred felt or net layer having a thickness of preferably 0.6 to 1.4 mm.

The channel area of the flexible plate  
15 comprises a slit area 9a having a plurality of parallel cuts, preferably 5 to 7 parallel cuts, and one cut perpendicular thereto, preferably located in the centre of the plate.

The flexible closure plate according to the  
20 invention opens easily by squeezing the container and admits replacement air into the container and admits replacement air into the container on termination of the squeezing, whereupon it again closes very tightly. Due to the shape of the spout,  
25 not even a thick paste dried quickly and, in spite of a long storage, the dispensing container according to the invention remains ready for use.

The total cross-sectional area of one or more  
30 flow channels extending through the channel area 7 of the closure member 6 and the channel area 9 of the closure plate 8, if any, is large during flow, preferably about 10 to 30% of the surface area of the channel area 7 and/or 9.

The closure member and the diameter of the  
35 orifice are selected according to the substance to be dispensed.

The closure member and the diameter of the  
orifice are selected according to the substance to be dispensed.

40 The following examples illustrate the invention:

#### Example 1

A dispenser provided with a closure member and mounted with the dispensing spout facing downwards is filled with liquid soap. The diameter  
45 of the perforated channel area of the closure member is 11.5 mm and has 97 perforations, each with a diameter of about 0.4 mm. The inner diameter of the dispensing spout at the outlet opening is 2 mm. The container is easy to use and  
50 does not leak after use when aqueous solutions containing surfactants and having a viscosity of 500 centipoise are dispensed by the container.

#### Example 2

A dispenser mounted with the dispensing  
55 spout facing downwards and lacking a closure member is filled with a hand lotion which is to some extent thixotropic and has a viscosity of about 30.000 centipoise. The inner diameter of the dispensing spout at the outlet opening is 1.3  
60 mm. The hand lotion is easy to dispense. The container does not leak after use.

#### Claims

1. A dispenser for fluids comprising a container

preferably of an elastic flexible material, such as  
65 plastics, having a dispensing spout at one end, a closure member possibly being provided with said container, while dispensing takes place by squeezing the front surface of said container inwards, said container being securable to a base  
70 with the dispensing spout directed downwards, characterized in that the dispensing spout is cone-shaped and is severable at predetermined points which are determined as a function of the viscosity of the liquid to be dispensed and of the  
75 elasticity of the compressible container, and in that a closure member is possibly located between the dispensing spout and the container through which closure member one or more channels extend during flow.

80 2. A dispenser as claimed in claim 1, characterized in that the length of the dispensing spout is 2 to 4 cm, preferably about 3 cm, and in that the inner diameter of the dispensing spout at the leading end is 1 to 6 mm and at the other,  
85 narrower end 0.1 to 1.5 mm.

3. A dispenser as claimed in claim 1 and 2, characterized in that the length of the dispensing  
90 spout is 3 cm and it has four severing points located at positions where the inner diameter is about 2.40, 2.00, 1.30 and 1.00 mm, or that the length of the dispensing spout is 2.5 cm and it has three severing points located at positions  
95 where the inner diameter is about 1.75, 1.25 and 1.00 mm, or that the length of the dispensing spout is 2.2 cm and it has two severing points located at positions where the inner diameter is about 2.00 to 1.10 mm.

4. A dispenser as claimed in claim 1 and 2, characterized in that the closure member is  
100 formed by a sleeve having a netlike open-pored or perforated channel area.

5. A dispenser as claimed in claim 1 and 2, characterized in that the closure member is  
105 formed by a sleeve having a netlike, open-pored or perforated channel area and of a closure plate having a netlike, open-pored, perforated or slit channel area.

6. A dispenser as claimed in claim 5, characterized in that the channel area in the  
110 closure plate made of an elastic material, preferably rubber, is a slit area having a plurality of parallel cuts and one cut which is perpendicular to said parallel cuts and preferably located in the centre of the plate, preferably the channel area  
115 has 5 to 7 parallel cuts.

7. A dispenser as claimed in claims 1 to 6, characterized in that the total cross-sectional area of one or more flow channels extending through  
120 the channel area in the closure member and the channel area of the closure plate, if any, is large during flow, preferably about 10 to 30% of the surface area of the channel area.

8. A dispenser as claimed in claim 7 characterized in that the diameter of the channel  
125 area is about 1 cm.

9. A dispenser as claimed in claim 4, characterized in that the closure member is a sleeve which is made of plastic and in which the

channel area is perforated and the total area of the perforations is about 10 to 20% of the surface area of the channel area.

5 10. A dispenser as claimed in claims 1 to 9, characterized in that the length of the channels in the channel area is 0.5 to 1.3 mm, preferably 1.0 mm.

10 11. A dispenser for fluids comprising a container of an elastic flexible material, such as plastics, having a dispensing spout at one end, said dispenser being secured to a base with the dispensing spout directed downwards while dispensing takes place by squeezing the front surface of said container inwards, characterized in  
15 that a closure member, i.e. a plate made of rubber or any other elastic material and provided with one or more curved slit-like cuts is located between the dispensing spout and the container.

20 12. A dispenser as claimed in claim 11, characterized in that it has one perpendicularly

cut curved cut.

25 13. A dispenser as claimed in claim 11, characterized in that it has two or more curved cuts cut from both sides of the plate obliquely with respect to the plane of the plate.

30 14. A dispenser as claimed in claim 11, characterized in that a closure member, i.e. a plate made of rubber or any other elastic material and provided with a curved Y-shaped slit-like cut is located between the dispensing spout and the container.

35 15. A dispenser as claimed in claim 11, characterized in that the closure plate between the dispensing spout and the container is embedded in a supporting sleeve at the end of the container neck.

40 16. A dispenser for fluids according to claim 1 substantially as described hereinbefore with particular reference to the accompanying drawings.